# EXECUTIVE SUMMARY

## 1. PREAMBLE

Minerals are the chief source of present phase of industrialization, and play an important role in the present phase of the national economy and overall development of the nation.

India is endowed with significant mineral resources. India produces 89 minerals out of which 4 are fuel minerals, 11 metallic, 52 non-metallic and 22 minor minerals.

21.373Ha of mining lease area is located in Pharhada Village, Simga Tehsil, under Raipur District (C.G.), which includes khasara number 1732/1, 1727/1. The above land use is non-forest govt. Revenue land. The mining lease was earlier sanctioned upto 22/12/2015 from 23/12/1995 for 20 year for Mineral Limestone. The lease area is being under worked. Working permission was issued on 06.03.2003 by the collector Raipur. However the mine working could be started on 20.10.2004.

The lessee firm is ownership firm register under firm act and shri Akheraj Lunia is owner of the firm:

In order to assess the likely impacts on environment due to ongoing mining activity and to have a tool of environment management, M/s Akheraj Lunia has submitted the Rapid Environment Impact Assessment study report for mining project.

## 2. LOCATION

21.373Ha of mining lease area is located in Pharhada Village, Simga Tehsil, under Raipur District (C.G.), which includes khasara number 1732/1, 1727/1. The above land use is non-forest govt. Revenue land.

## 3. ENVIRONMENTAL SETTING

Pharahda area is situated in the central part of Chhattisgarh Basin under the drainage system of the river Sheonath. Subsurface lithology of this area is made of flatly lying thick sediments of limestone dolomite and shale. On these rocks gently undulating and almost flat of surface has developed. The development of this flat topography has reached the stage of maturity and subdued relief.

The area is drained by north easterly flowing Jamuniya Nadi at 3.5 km north from here. Small tributaries join this from south east and North West contour line of 270 meters makes an open loop portion. A nala emerges from the area and flows northwards between the villages: Khapri and pharhada to join jamuniya nadi. Downstream of this nala at about 1.5 km distance 260 metres contour forms the V line of this nala. The area is devoid of vegetation. The land is rocky and barren.

The ML area is located in Survey of India Toposheet No. 64G/14. Geographically, the mine is located between the following coordinates:

Latitude 21°38'33" - 21°38'48" N

Longitude 81°59' 18" - 81°59'30" E

**Details of Project Settings**

| S. No. | *Particulars* | Details |
|---|---|---|
| 1 | Latitude | 21°38'33" - 21°38'48" |
| 2 | Longitude | 81°59' 18" - 81°59'30" |
| 3 | Height above mean sea level | 270 - 260 AMSL |
| 4 | Nearest City | Bhatapara at about 13.5 km |
| 5 | Nearest Railway Station | Bhatapara -13.5km |
| 6 | Nearest Airport | Raipur - 60km |
| 7 | Nearest Highway | Bhatapara - Suhela State highway |
| 8 | Nearest Village | Khapri is 1.5 km - NW |
| 9 | Hills/Valley | No |
| 10 | Ecological Sensitive Zone | Nil |
| 11 | Reserve Forest | Nil |
| 12 | Historical Place | No |
| 13 | Nearest River/ Nalla | Jamuniya Nadi- N- 3.5km<br>Nalla- NNW-1.5km<br>Local nalla – 0.1km-west<br>Banjari Nalla-2.5km-E |
| 14 | Annual Climatic Conditions | Max. Temperature – 46°C<br>Min$^{m}$ Temperature – 8.0°C<br>Average Rainfall–985 mm |

## 4. TRANSPORT

The proposed lease area is accessible by tar road from Bhatapara (11km mile stone) on Bhatapara - Suhela state highway and from 11km milestone to mine site 1.5km serviceable approach road will have to make. Drinking water is available in dug wells and tube wells. The nearest dug well from the area is 1.5km in Village

Khapri. Nearest village of the lease area is Khapri at about 1.5km. Nearest railhead is Bhatapara 13.5 km north of the area. The area is at the extreme southwest corner of the village Boundary of Pharahda at the southwest side of the area there is diversion bund. Other sides are open rocky land.

## 5. REASON FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The impact of mine on the environment depends to a large extent on its location with respect to Human settlements, meteorological conditions, ambient air quality, water bodies, agricultural and forest land etc.

Most of the adverse impacts of mines are amenable to technological control by providing necessary preventive and control measures and finally through effective environmental management of the operating mines. Keeping in view the likely impacts of mines on environment, this Rapid environment impact assessment report has been prepared for submission to State Pollution Control Board and Ministry for Environment and Forests (MoEF) for clearance of the proposed additional mining area.

## 6. PROJECT DESCRIPTION

The reserves have been recalculated on the basis of residual mineable area in the lease area and mineable thickness of limestone as exposed along the mine faces, the grades of limestone on mine faces and also the borehole data. Cross sectional method has been adopted for reserves estimation. The reserves up to 4 to 6m depth to which the limestone is exposed in the mine faces and boreholes are put into proved category. Below this upto 10m depth the reserves are classified as probable reserves.

| Category | Depth | Geological reserve | Mineable reserve |
|---|---|---|---|
| Proved | 4 to 6m | 1380625 T | 1104500 T |
| Probable | 6m to 10m | 1508000 T | 1206400 T |
| Total | | 2888625 T | 2310900 T |

Mine life: production =60000TPA

Total proved mineable reserve is 1104500T/60000 = 18.40 years

## 6.2 Salient Feature of the mine

The general details of the mining lease area are given below:

| S. No. | Particulars | Details |
|---|---|---|
| 1 | Type of Mine | Open Cast |
| 2 | Mining Lease Area | 21.373Ha |
| 3. | Mineable Area | 14.713 Ha |
| 4. | Existing Pits & Quarries | 1.295Ha |
| 5. | Existing Dumps | 0.152ha |
| 6. | Infrastructure and road | Nil |
| 7. | Mineral Storage | Nil |
| 8. | Plantation | 0.05ha |
| 9. | Barren Land | 19.876 Ha |
| 10. | Geological Reserve | 2888625.00 tonnes |
| 11. | Recoverable Reserve | 1104500.00tonnes |
| 12. | Method of mining | Manual/semi-mechanized |
| 13. | Ultimate Pit Slope | $45^{o}$ |
| 14. | Present capacity of mines | 60000 tonnes per annum |
| 15. | Expected Life of Mines | 18 years from 2008 |
| 16. | Lease Period | 20 year upto 2015 |
| 17. a | Thickness of soil | |
| | Minimum | 0.0 |
| | Maximum | 0.5 m |
| | Average | 0.25 m |
| 17.b | Thickness of overburden (shale) | |
| | Minimum | 0.5m |
| | Maximum | 0.75 m |
| | Average | - |
| 18 | Stripping Ratio | 1:0.05 |
| 19 | Existing mode to transportation of limestone | Road |
| 20 | Area to be covered under dumps in end of lease period | 0.5ha |
| 21 | Area covered under pit in end of lease period | 10.0ha |
| 22 | Area to be reclaimed by end of lease period | Nil |
| 23 | Area to be covered under plantation by end of lease period | 5.0ha |
| 24 | Average mRL | 270-260AMSL |
| 25 | Ultimate Depth of Mining | 10m up 260mRL |
| 26 | Ground water table | |
| | Monsoon period | 03m bgl (257mRL) |
| | Dry month | 6m bgl (254mRL) |

## 6.3 Mining Method

All the operations of opencast working have been done by manual/semi mechanized. Soil and clay intrapped in solution channels and cavities is removed by manual labour to avoid dilution of limestone. The under lying limestone of 4 to 6m thickness is then won in ore bench with help of 35mm dia jack hammer drills shallow hole blasting and the fragmented rocks being loaded by loader into tipping trucks. Oversized boulders are again drilled by small dia. Jack hammer drills and blasted. On the blasted pile the shale chips and clay materials are again removed by hand sorting. The rejected shale and clay are removed and spread over the periphery of lease for making bund. The existing haul road will remain till completion of mining. The present sump will be extended towards south west up to ML boundary. The mine water is pumped out from this sump and then discharged into the nalla west of the quarry.

The mine will be opened from northern end, keeping a working face length of 100 meters at initial stage. Open manual/semi mechanized mining method will be adopted. In this system overburden removal and sorting of limestone from interlayered shales will be done manually. Drilling operation will be done by 35mm dia Helco drills using slurry explosives and ANFO. The oversize boulders will be broken by secondary blasting with the help of jackhammer drills and small dia explosives. The fragmented and sorted limestone will be loaded into tipper trucks by front end loaders and dispatched to consumer point.

**Year wise development for the first five years**

| Year | Area to be Excavated (Sq. M) | Quantity of OB/Soil in cum | Quantity of mineral reject (T) | Limestone in T |
|---|---|---|---|---|
| 1st | 6000 | 3000 | 3000 | 60000 |
| 2nd | 6000 | 3000 | 3000 | 60000 |
| 3rd | 6000 | 3000 | 3000 | 60000 |
| 4th | 6000 | 3000 | 3000 | 60000 |
| 5th | 6000 | 3000 | 3000 | 60000 |
| TOTAL | 30000 | 15000 | 15000 | 300000 |

**Proposed Rate of Production**

It will be about 60000 tonnes per year of saleable Limestone for full year after complete development of the mine.

**Loading**

Loading of limestone will be done by manual to the trolley/trucks and will be sending to the end users. The overburden will be removed and stacked in a place in the surface. Subsequently it will be mechanically loaded to the tipper for onward dumping to the predetermined space in the lease boundary.

**Hauling/Transport**

Ones the self ripping trucks of 10 tonnes capacity are loaded with (-600mm size). Limestone fragments, the same will be driven to consumer's point at about 45km away. As the transport will be done on contract it will not come under mining operations. It may be pointed out here that a tripper can be loaded in 10-15 minutes and it can make 3 trips in one shift.

## 6.4 Mine Drainage

In the area of Pharahda Limestone deposit the surface slopes towards east. The query will be 10m deep from surface with floor sloping towards east at a gradient of 1:60 to 1:100. A suitable sump will be provided at the north-eastern end, where mine water will be collected and then dewatered into check dam. The expected grade of quarry floor will assist in good mine drainage..

## 6.5 Solid Waste Management

Out of 21.373ha mining lease area only 14.713ha is limestone bearing. Over the mineral bearing area 1.87lac cum overburden is estimated as below:

| Thickness of OB in m | Area of influence sqm | Volume of OB cum |
|---|---|---|
| 1.5 | 29984 | 44976 |
| 1.22 | 72192 | 88074 |
| 1.20 | 44960 | 53952 |
| Total | | 187002 |

This overburden material contains soil, clay filled in cavities and detatched boulders of limestone. It will be removed by manually by opening a 1.5m

development bench. The limestone boulders which are nearly 10% or 18700 cum or 41500T will be hand picked. Remaining quantity of OB will be 1,68,300cum.

**Selection of dumping:** remaining soil and clay overburden will be backfilled at the northern end of the pit. Before backfilling some quantity of it will be spread along the lease boundary left as peripheral strip of 7.5m width. Thus the overburden waste material as estimated for handling 168300cum in volume can easily accommodated in the sites as suggested below:

**Maximum Height & Spread of Dump:**

Sites of overburden dumps and their design are as tabulated-

| s. no. | Location for disposal of OB | Spread of dumping area | | | | |
|---|---|---|---|---|---|---|
| | | Length M | Width M | Area in sqm | Height M | Volume cum |
| 1 | Peripheral strip along quarry | 1200 | 4 | 4800 | 1.5 | 7200 |
| 2 | Backfilling at north in end of mine life | 221 | 73 | 16133 | 10 | 161330 |
| | Total | | | | | 168530 |

## 6.6 Resource Requirement

The present proposal is of existing mining activity at mining lease area of 21.373ha at village Pharhada Tehsil Simga, district Raipur, CG. For efficient operation of the Mines all necessary utilities will be made available, a brief description of the same is given below.

**Storage facility**

It is proposed to provide adequate storage facilities for the excavated mineral, explosives and waste dumps, which is generated/used during mining process. Proposed excavated minerals and waste dumps will be kept in the existing mining lease area.

**Project Cost**

| Project | Estimated Cost in Lac of Rupees |
|---|---|
| Mining of Limestone | **Rs7.0 Lac** |

**Electric System**

The power requirement for the project has been met by CG State Electricity Board, which is available at near village.

**Water Supply**

The total fresh water needs to be pumped is about 10 KL per day for consumption of domestic and mining purpose. This quantity of water will be taken from the ground water.

## 7. EXISTING ENVIRONMENT SCENARIO

### 7.1 Climate

The climate of this region may be considered as extreme being intensely hot in summer and moderately cold in winter. The climate of the area is also characterized by a hot dry summer and well distributed rains in the monsoon season. The cold season commences from December and lasts till the end of February. The hot season follows thereafter and continues till about the second weak of June. The south west monsoon season is from the middle of June to the end of September.

- **Temperature**: The temperature rises steadily from the beginning of March till May, which is usually the hottest month of the year. The mean maximum temperature in May is 41.89°C. May and the early part of June, prior to onset of the south west monsoon are rather hot and the dust raising scorching winds add to the discomfort. The arrival of the monsoon air during second week of June brings relief, and the weather remains pleasant throughout the south west monsoon season. The day temperature increases slightly towards the close of the monsoon season, and the rise is maintained in October after the withdrawal of the monsoon. However, the night temperature begins to drop from October onwards. The day temperatures also begin to drop rapidly from the middle of November. December is usually the coldest month while the mean daily minimum temperature at 12.55°C. Cold waves sometimes affect the area in association with the passage of western disturbances across northern India in the cold season. Average yearly temperature varies between 32.94°C to 20.85°C.
- **Relative Humidity:** The relative humidity is high during the southwest monsoon, being generally over 80%. After the monsoon season, humidity

decreases, and during the winter season, the air is fairly dry. The driest part of the year is the summer season, with the afternoon humidity is generally about 25% or even less

- **Rainfall:** Monsoon in the area comes from south-westerly winds. The average annual rainfall is reported as 1134.7 mm, and about 87% of this is received in the monsoon season. Rainfall during July and August is highest in the year, and constitutes more than half of the total annual rainfall. The variation in the rainfall from year to year is not large.
- **Cloud:** 30 years average data reveal that maximum cloud cover was observed around 7.1 in the month of July August. Whereas cloud cover was observed around 2 (in oktas) in the month of November, December, January, February and March.
- **Wind Pattern**

  Winds are generally light to moderate, with some increase in force in late summer and the southwest monsoon seasons. In the post monsoon and winter months, winds are mainly from directions between north and east. In March, winds are variable in direction. By April, winds from the west and southwest begin to appear and these predominant during the period May to September. Average annual wind speed is 5.3 Km/hr. The windroses at IMD, Raipur for the period 1979-1990 is given in Fig 3.3 at 8.30 hrs and 17.30 hrs, respectively.
- **Wind Patterns during study period**

  The predominant directions of wind were observed from SW & SSW.

## 7.2 AIR QUALITY

To establish the ambient air quality, sampling and testing were conducted. Air sampling stations were established at eight (8) locations around the proposed mining area to assess the background air pollution levels.

**Ambient Air Quality Monitoring Stations**

| Sr. No. | Location code | Name of Station | Distance (km.) | Direction |
|---|---|---|---|---|
| 1. | A-01 | Pharahda | 2.5 | N |
| 2. | A-02 | Suhela | 3.25 | S |
| 3. | A-03 | Khapri | 1.5 | NW |
| 4. | A-04 | Mopar | 5.5 | E |

| | | | | |
|---|---|---|---|---|
| 5. | A-05 | Bhothidih | 2.5 | W |
| 6. | A-06 | Turma | 6.0 | NE |
| 7. | A-07 | Jaraund | 2.0 | SE |
| 8. | A-08 | Khairwari | 3.0 | SW |

**COMPARISON OF AIR SAMPLING RESULTS WITH CPCB NORMS**

| | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | CPCB Norms | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Indl. & Mixed used area | Residential & Rural Area |
| **November, 2008 to January, 2009** | | | | | | | | | | |
| **SPM Concentration** | | | | | | | | | | |
| Average | 118.5 | 469.75 | 140.42 | 154.63 | 144.67 | 130.25 | 113.42 | 115.25 | 500 | 200 |
| Maximum | 146 | 198 | 164 | 176 | 168 | 160 | 130 | 128 | | |
| Minimum | 96 | 128 | 112 | 108 | 120 | 88 | 100 | 97 | | |
| **RPM Concentration** | | | | | | | | | | |
| Average | 35.56 | 50.92 | 42.12 | 46.27 | 43.23 | 39.18 | 34.26 | 34.58 | 150 | 100 |
| Maximum | 44 | 60 | 50 | 54 | 50 | 48 | 44 | 38 | | |
| Minimum | 28 | 38 | 34 | 32 | 36 | 26 | 30 | 29 | | |
| **SO2 Concentration** | | | | | | | | | | |
| Average | 6.96 | 12.08 | 10.32 | 10.37 | 8.75 | 5.78 | 7.48 | 6.51 | 120 | 80 |
| Maximum | 8.2 | 14.4 | 12.8 | 12.2 | 9.6 | 6.98 | 8.0 | 7.8 | | |
| Minimum | 5.65 | 8.6 | 8.2 | 8.1 | 7.2 | 4.67 | 6.70 | 5.2 | | |
| **NOX Concentration** | | | | | | | | | | |
| Average | 9.39 | 15.52 | 13 | 12.98 | 10.46 | 8.3 | 9.45 | 9.2 | 120 | 80 |
| Maximum | 10.92 | 18.2 | 16.2 | 15.8 | 11.6 | 10.75 | 9.98 | 10.9 | | |
| Minimum | 8.07 | 12.9 | 10.2 | 10.12 | 9.6 | 7.06 | 8.3 | 7.7 | | |

## 7.3 NOISE LEVEL

Ambient noise levels were measured at different locations (same as ambient air monitoring locations for two days on hourly basis) to establish present scenario which shall be described as follows.

- All the values are well within the norms prescribed by CPCB for industrial and commercial area.
- Main source of noise are traffic movements.

## 7.4 WATER QUALITY

### Surface Water

The Surface water bodies in the study area mainly Jamuniya River located at 3.5km in North direction, Nala located at 1.5km in NNE direction, local nalla located at 0.1km in west direction & Banjari Nalla located at 2.5km in east direction respectively from mine. The data conform to the water quality standards for most of the parameters. The dissolved oxygen levels is 2.8-2.9 mg/l, Total Hardness is

152-168 mg/l; BOD levels between 4-6mg/l. The heavy metal content has been observed within the limit. The analysis of the sample indicates that the organic pollution of River is insignificant. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 2296.

**Ground Water**

Water supply in the most of the villages depends on ground water resources. Well water is used for domestic as well as irrigation purposes. Ground Water quality analysis was carried out at 2 locations and the frequency of sampling was once /month/station. Ground water samples were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on ground water. The samples were collected and analysed as per the procedures specified in "standard Methods for the examination of water & Wastewater" published by American Public Health association (APHA). pH in ground water sample was observed to be in the range 6.9 to 7.6 while conductivity was observed in the range of 603-872□mohos/cm. The value of alkalinity and hardness were observed in the range of 98-102mg/l and 168 to 180 mg/l respectively. Whereas heavy metal was found to be within the limit.

The physico-chemical and biological analysis revealed that all the parameters were well within the prescribed limits of IS: 10500.

## 7.5 SOIL QUALITY

Three locations within 10 km radius of the project site were selected for soil sampling. At each location, soil samples were collected from three different depths viz. 30 cm, 60 cm and 90 cm below the surface and homogenized. The homogenized samples were analyzed for physical and chemical characteristics. For general characterisation of soil a few random samples from the study area to the depth of about 15 cm were collected. Soil samples so collected were brought to the laboratory for analysis.

It has been observed that the texture of the soil was observed to be sandy Silty nature. The organic carbon was found to be in the range of 0.31% to 0.42% The nitrogen and phosphorus were observed to be in the ranges of 8.9 to 15.7mg/100

and 5.4 to 8.4mg/100 respectively the pH range at the soil vary in between 6.1 to 6.4. The soil has medium percentage of iron, zinc and chloride.

## 7.6 LAND USE PATTERN

Present landuse pattern of the 21.373 hectares mining lease area is as given below:

**Land Use Pattern of Mining Lease Area**

| Items | Existing | At the end of lease period |
|---|---|---|
| Total Mineable area | 14.713ha | |
| Mineable Reserve | 11,04,500 Tonnes | Nil |
| Ultimate depth of mining | 3 mt ( 267 AMSL) | 10 mt ( 260 AMSL) |
| Ultimate pit slope | $45^0$ | $45^0$ |
| Area under dumps | 0.152 | nil |
| Area under pits | 1.295 | 10.0 |
| Overburden quantity | 20000 | 60000 |
| Area to be reclaimed | Nil | Nil |
| Infrastructure & Road | Nil | 0.01 |
| Mineral storage | Nil | nil |

The study area covers about 20735 ha. For computation of the land use pattern in the study area based on the village-wise land-use data given in the census records, the geographical area of all settlements covered within the study area, though many villages in the peripheries of the circular study area are partially covered. Perfect delineation and quantification of land uses for the partially covered parts of villages of the study area is not possible, hence the entire village area is considered for the study, irrespective of its coverage within the village boundary.

The land use is classified into four types – viz. forests, area under cultivation, culturable waste and the area not available for cultivation. The land under cultivation is further sub-divided into two types viz. irrigated and un-irrigated.

**Land-use Pattern in the Study Area**

| S. N. | Particulars | Study Area (ha) | Percentage Coverage |
|---|---|---|---|
| 1. | Forest Land | 83 | 0.40 |
| 2. | Land under Cultivation | | |
| | a) Irrigated Land | 5121 | 24.70 |
| | b) Un irrigated Land | 10727 | 51.73 |
| 3. | Culturable Waste Land | 3395 | 16.37 |

| | | | |
|---|---|---|---|
| 4. | Area not available for cultivation | 1409 | 6.80 |
| | Total Area | 20735 | 100 |

## 7.8 SOCIO-ECONOMIC CONDITIONS

The study area comprises of total 49 Villages. These villages fall under one tehsil – Simga. The demographic details have been abstracted from Primary Census Abstract- 2001(CD) of Chhattisgarh obtained from Office of Registrar General India, New Delhi.

**ESTIMATED BASIC STATISTICS OF THE STUDY AREA**

| S. No. | Detail | Population in No/% |
|---|---|---|
| **1** | Households | 7922 |
| **2** | Total Population | 40254 |
| **2.1** | Male | 19871 |
| **2.2** | Female | 20383 |
| **2.3** | Schedule Tribe | 5133 |
| **2.4** | Schedule Cast | 9173 |
| **3.0** | Literacy Rate | 42.53 |
| **4.0** | Sex ratio (No. of Female per 1000 Male | 1026 |
| **5.0** | Occupational Pattern: | |
| **5.1** | Total Working Population (% of total population ) | 51.38% |
| **5.1.1** | Total Main Worker (% of total Working Population | 61.60% |
| **5.1.2** | Marginal Workers (% of total Working Population) | 38.40% |
| | Cultivators (% of worker) | 40.32% |
| | Agricultural Labors (% of worker) | 43.79% |
| | Household Worker (% of worker) | 2.90% |
| | Other Workers (% of worker) | 14.10 |
| | Total Non Workers (% of total Population) | 48.62 |

## 8. IMPACT ASSESSMENT

Mining activities is bound to have an adverse impact on existent environment. An understanding of the nature and extent of various impacts is essential in devising the methods and advance planning to mitigate the impacts and ultimately restore the land to useful conditions.

## 9. IMPACT EVALUATION

An attempt has been made to evaluate the impact of project in terms of both quality and quantity by using modified matrix method for crucial environmental parameters. The environmental impact evaluation of possible effects as a result of proposed mining area is primarily based on study of objectives, process, surrounding environment etc. The aspects such as water, air, land and related issues have been assessed on the basis of mining operations for similar activity. The environmental impacts identify the possible relationship of proposed mining operations with respect to environmental parameters. Their relationship can be beneficial or adverse and can be further classified as short term, long term, reversible, irreversible, local or regional. The evaluation of the impact of proposed activity are presented in Table below

## 10. ENVIRONMENT MANAGEMENT PLAN

### 10.1 Reclamation of Land

A portion of the pit at its Northern and Measuring 221x73 meter will be backfilled by the available overburden waste material. Accordingly 16,133 Sqm areas i.e. 7.5% of total ML area will be back filled. The remaining area which will excavated at the abandoned stage (1,31003 sqm ) will be converted into a water reservoir to be used for irrigation or fish breeding and domestic use by villagers

**Post land use plan**

| | | |
|---|---|---|
| (a) pond | - | 13.0997ha |
| (b) plantation | - | 6.66ha |
| (c) plantation in reclaimed area | - | 1.6133ha |

### 10.2 Green Belt Development

The massive afforestation planned for the project shall generate a forest having greater tree density (about 10 trees for first five year per $90m^2$). The proposed extensive will enhance the vegetation quality as well as aesthetic quality of the area. Thus there is no adverse impact is envisaged over biological environment due to proposed mining activity.

In initial stage the green belt will be developed in following manner.

| S. No. | Year | Afforestation in Ha | Plantation in No. |
|---|---|---|---|
| 1 | 1st | 0.5 | 1250 |
| 2 | 2nd | 0.5 | 1250 |
| 3 | 3rd | 0.5 | 1250 |
| 4 | 4th | 0.5 | 1250 |
| 5 | 5th | 0.5 | 1250 |
| Total | | 2.5 | 6250 |

The plantation will be done during rainy season July to September every year. The plantation will be done on dumps, around ultimate pit limits, in quarry and open area etc. Following precautions shall be taken for survival and protection of plantation: Plantation shall be done during rainy season;

- Inter-cultural operations like weeding, soil turning basin making.
- Watering to the plants with regular interval till well developed;
- Organic and inorganic fertilizers shall be put for proper development of plants;
- Spraying of insecticides, pesticides and growth regulators for disease free growth of plants;
- Pruning and trimming of plants shall be done at regular interval;
- Barbed wire fences shall be provided around plantation and any fences damaged by miscreants and cattle shall be repaired frequently to prevent the animal nuisance; and
- Watchmen shall be employed to prevent the cutting of trees by outsiders and also control of public movement through planted area.

## 10.3 Measures to Improve Socio-Economic Conditions

The impacts of the project would be felt in an integrated manner on the socio-economic environment in the study area. There is no village in core zone and further no displacement is required for the proposed project and therefore impact will be positive side rather negative. The impacts on the different components viz employment, housing, educational, and medical and transport facilities, fuel availability, economics, status, health agriculture is not significant because size of project is very small. However, it would definitely increase the employment

opportunity (primary as well as secondary) in the project area. Some of these impacts would be beneficial.

- The project will have a strong positive employment and income effect, both direct as well as indirect.
- Migrant-Non migrant ratio shall shift towards migrant side. This will happen because of (i) better employment opportunities due to this project and (ii) relatively low agricultural yield through traditional agricultural practice with monocrops.
- The project shall speed up the growing view on importance of education among people in study area.
- The project is going to bring about changes in the pattern of demand from food to non-food items if sufficient income is generated.
- The project is not going to influence the existing traditional agricultural situation significantly. It may help to improve agricultural production by way of providing additional income to the farms from supplementary sources.
- People perceive that the project will bring handful gains by way of creating significant job opportunities along with development of social infrastructure.

## 10.4 Air Pollution Control Measures

Following measures shall be taken to mitigate the effect of mining operation over ambient air environment:

1. Regular spraying of water by water sprinkling system over haulage roads.
2. To reduce dust generation during loading operation water shall be sprayed over the muck pile to the loaded;
3. To reduce dust generation during plying of dumpers on the haul road. Water sprinkling is done at frequent intervals. Water sprinklers shall be installed at the mine haulage road;
4. To reduce spread of dust, plantation along the mining lease boundary and plantation shall be also done along haul roads.
5. Periodic maintenance of haulage roads.
6. All over burden dumps shall be stabilized with legumes and grass to prevent the erosion of soil and arrest the dust emission during windy days.

In addition to the above following additional mitigation measures shall be adopted and it is expected to continue in future also:

1. Dust due to drilling shall be minimised by using wet drilling method like water injection system.
2. Dust mask shall be provided to all workers working in dusty atmosphere.
3. Tree Saplings shall be planted at the periphery of mining lease
4. Regular maintenance of vehicles and machinery's shall be carried out in order to control emissions;
5. A good house keeping and proper maintenance shall be practiced which will help in controlling pollution.

## 10.5 Noise Pollution Control Measures

The main sources of noise in mining activity are drilling, blasting, material handling machinery, loading equipment, etc. Following mitigation measures should be taken to control noise pollution:

1. Wherever the noise levels exceed 85 dBA, workers should be provided with earmuffs, ear plugs etc.
2. Hydraulic drills shall be used for drilling;
3. All moving parts of machine shall be properly lubricated;
4. Non-moving parts of machine shall be properly fastened;
5. A barrier of overburden at mine boundaries shall be made and three rows of trees are proposed to be planted to reduce propagation of noise;
6. Noise barriers, silencers and enclosures shall be incorporated for equipments, which emit high noise levels.
7. All the basic equipments and various machineries shall be kept well maintained.
8. Thick green belt around the mining pit and along the haulage roads.
9. As far as possible heavy and noisy workers shall be avoided during nighttime.

## 10.6 Water Pollution Control measures

Following measures have been taken to avoid accumulation of water:

1. Pump having required capacity shall be installed to lift accumulated rain water from working pit.
2. There shall not be no over flow on wash off from dumps nor is there any beneficiation plant. Only rainwater is pumped out of the mine;
3. There is no toxic constituent in water and soil so water collected in sump is free from any toxic substances.
4. A silt-settling tank shall be constructed in northern barrier zone area to settle heavy particle before discharging water into drain.
5. Quality of water accumulated in the working pit may be checked during monsoon.
6. It shall be ensured that silt content in the mines discharged is minimum.
7. It shall be ensured that quality of drinking water for the worker is hygienic and good sanitation system is available.

## 11.0 Conclusion

The limestone mining project of M/s Akheraj Lunia, village –Pharhada, Tehsil-Simga & Dist. Raipur (MP) will be environmental compatible to the surrounding due to the high standards of pollution control measures to be adopted during the operation activity. Thus it can be safely stated that the mining activities will not have any adverse effect on the surroundings, if the proper environmental management plan is adopted.